

Test

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Approved For Release 2003/12/23 : CIA-RDP33-02415A000400380134-7

To: ① Col Beurli

② Mr Bissell

① Important that principal  
ope. personnel read and  
understand. Instruction should  
be raised with [redacted]

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② Please pass to [redacted]  
ope. is finished. He will be most  
interested [redacted]

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U-2C DEPLOYMENT "B"

AUGUST 29, 1979

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SUMMARY

Two U-2C Airplanes were ferried to Detachment "B" without mishap and on schedule, reaching that station on August 15, 1959. The accompanying team accomplished the training of operating and maintenance personnel. During a two week period of intensive training activity, ten pilots were checked out. All phases of the deployment accounted for 30 flights and 116:05 flying hours.

Operation of the aircraft, engine and other equipment was very satisfactory and the system is considered operationally ready.

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INTRODUCTION

The B-2C Airplane was developed and tested in the summer of 1959 at Burbank and Edwards Air Force Base, California. This phase culminated with completion of 400 hours of flying on August 1, 1959. Two of this type aircraft were then deployed to Detachment "B".

25X1 A team of ☐ members accompanied the airplanes to the Detachment and served as a training aid to insure proper utilization and maintenance of the new equipment.

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**SECRET**LOG OF FLIGHTS

Aircraft 351

<u>Date</u>	<u>Pilot</u>	<u>Type of Flight</u>	<u>Flight Hours</u>
12 August 1959		Ferry to Plattsburg	6:20
12 August 1959		Test flight	2:30
13 August 1959		Ferry to [ ]	3:35
15 August 1959		Ferry to "B"	5:15
18 August 1959		Shakedown	1:30
18 August 1959		Training	2:00
19 August 1959		Training	2:00
19 August 1959		Training	2:00
20 August 1959		Training with A-2	4:00
21 August 1959		Training with "B"	4:00
22 August 1959		Training	4:10
25 August 1959		Simulated Mission	7:15
26 August 1959		Training	2:05
27 August 1959		Simulated Mission	7:40
TOTAL HOURS			59:20

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**SECRET**LOG OF FLIGHTS

Aircraft 378

<u>Date</u>	<u>Pilot</u>	<u>Type Flight</u>	<u>Flight Hours</u>
12 August 1959		Perry to Plattsburg	6:20
13 August 1959		Perry to [REDACTED]	8:35
15 August 1959		Perry to "B"	5:15
16 August 1959		Shakedown	1:30
18 August 1959		Training	2:05
19 August 1959		Training	2:00
19 August 1959		Training	2:00
20 August 1959		Training	2:10
20 August 1959		Training	2:10
21 August 1959		Training	3:45
24 August 1959		Test Flight	2:10
25 August 1959		Training	4:15
26 August 1959		Training	4:20
27 August 1959		Training with "B"	2:05
28 August 1959		Training	4:05
29 August 1959		Training	4:00
TOTAL HOURS			56:45

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DISCUSSION

Ferry Phase:

25X1 The two Airplanes were ferried from Edwards Air Force Base, California to Detachment "B" in three (3) legs, with intermediate stops at Plattsburg New York and [ ] All ferry flights were made according to schedule and without serious difficulty. The accumulated flight hours for the Ferry Operation were 22:40 hours for Airplane 351 (including one (1) test flight at Plattsburg) and 20:10 hours for Airplane 353.

The first two legs were flown at ferry power conditions which requires cruise climb starting at 59,000 feet. The last leg was flown at maximum power in order to have a check on aircraft, auto-pilot, and engine operation under proper mission conditions.

Auto-pilot difficulty was experienced on both airplanes during the ferry phase. Other minor difficulties included weak face heat and a skipping fuel totalizer counter.

Training And Checkout Phase:

Maintenance Personnel

A brief series of lectures was provided by the visiting team to acquaint Maintenance Personnel with the general characteristics of the B-20 Airplane and the specific differences from the B-2. However, the major transfer of information occurred during the daily handling of the airplanes.

The engine was removed and reinstalled in one of the airplanes to provide first hand experience with the details of this operation. Engine installation is considered the major item requiring new knowledge and technique.

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The spare engine was removed from storage and "built-up" insofar as the available parts would allow. It will be necessary to provide sufficient parts to completely prepare the engine for installation in the aircraft. This will insure a quick turn around of the airplane when it is necessary to change engines.

Specialized auto-pilot information was provided to those people directly concerned with this section.

### **Operating Personnel**

Brief lectures were also provided to the pilots and other operations people to acquaint them with the airplane and answer any questions arising. Flight Handbooks were made available to serve as the major information sources.

A short demonstration and shakedown flight was made in each B-20 airplane prior to the checkout flights for Detachment "B" pilots. Each pilot flew one (1) short and one (1) longer flight. A total of  pilots were checked out with 66:10 flying hours. All flights were made on time with no aborts or serious difficulties.

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### **Aircraft Systems Operation**

#### **Fuel System**

The fuel transfer and feed system has operated satisfactorily. One case of a skipping fuel totalizer counter occurred and the counter was replaced.

#### **Hydraulic System**

One minor hydraulic leak showed up during ground check and was easily repaired.

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### Engine Oil Cooling System

The additional 9 inch oil cooler has solved the high oil temperature problem. All types of flights have shown the oil temperature well within limits.

### Electrical System

The major problem in the electrical system remains excessive generator brush wear. The generator installed in airplane #358 had to be replaced after 41 hours of operation. The brush material was designated as #497. However the generator and brushes as installed in airplane #351 were still satisfactory after 60 hours of operation. This brush material was designated as NAA. For the present, frequent inspection of D.C. generator brushes will have to be made. Testing will continue to determine a satisfactory material.

One face plate heat rheostat was replaced due to insufficient face plate heat.

One generator warning relay was replaced. The cockpit warning lights remained energized after the battery had been turned off.

### Seal Pressure System

Airplane #351 had a leaking pressure seal system and continued to use excessively from the nitrogen bottle supply. The canopy seal and the lower equipment bay hatch seal were both found to be defective. They were replaced with new seals. This difficulty did not cause any cases of loss of pressurization.

Several times, a momentary change in equipment bay pressure occurred due to pilot selection of engine defrost air off and automatic cold position

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of the temperature control. This is easily prevented by leaving the engine wind shield defrost valve at least half open.

### Cockpit Throttle Stop

This gate type stop was provided to limit engine power to a nominal value for take-off. It has proved to be very valuable for night or instrument take-offs and also as a protective device to prevent over-tempering of the engine.

### Instruments

The fuel rate meter is subject to considerable fluctuation which seems to be chronic. This fluctuation, however, is not disabling. One failure of this system did occur and was traced to the transmitter.

One case of engine tachometer fluctuation was encountered but so far it has been only to a minor degree.

### Drag chute

The drag chute is operational and is adequately protected from the heat of the jet exhaust.

### Windshield Defrosting

The auxiliary heater blower is adequate for all conditions so far encountered. It is usually not necessary to use the heater. The flow pattern on the wind shield could be improved by revision of the director nozzles.

### Auto-pilot System

Trouble was encountered with airplane #358 during the second and last leg of the ferry mission. The auto-pilot would not respond to turn signals.

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Upon arrival at Det "B" the multiple channel of the main amplifier was replaced to correct this trouble.

During the last leg of the ferry mission on airplane #351 the auto-pilot at times would not hold headings. The auto-pilot directional gyro was replaced to correct this situation.

All missions during the checkout and training phase have been good. There have been no write-ups and the pilots are very satisfied with the auto-pilot operation. The ability of the pilot to control the system for all conditions with the cockpit controls has been very satisfactory.

#### Engine Operation:

##### Oil System

The engine in airplane #353 was troubled with erratic, fluctuating oil pressure for several flights. Replacement of the oil pressure regulating valve corrected this condition.

##### Roughness - Banging

The engine installed in airplane #351 is the original "banging engine". Previously operation at an RPM of 540° U. was adequate to avoid any banging or roughness while climbing from 40,000 feet to 60,000 feet. However; at the present time this engine must be operated no higher than an RPM of 500° U. through this area. Banging has been encountered at 515° U. and engine roughness as low as 505° U. However; if the 500° limit is observed on this particular engine, no difficulty is experienced. Operation at other altitudes at full power is satisfactory except that this airplane evidences a light, continuous high frequency vibration.

##### Flameout

One flameout was experienced during descent due to the aircraft reaching a low speed stalled condition at high altitude. This was not considered significant. Poststart was normal.

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The engine installed in airplane #353 operates normally using 5400 through the "badlands".

This airplane and engine seem particularly smooth throughout flight.

#### Fuel Control

The fuel control in airplane #351 was difficult to set properly at altitude. The EGT wandered and was difficult to control. This was corrected by replacing the seals on the fuel control sensing line.

This control and the engine speed are very sensitive to a change in vertical acceleration. This is not true on the other airplane engine. This symptom, although annoying, has not interfered with accomplishment of the mission.

#### Aircraft Performance:

##### Ferry Type Mission

25X1 The ferry type mission provides for level off at 59,000 feet and a curise climb at reduced power, resulting in maximum range. The flight legs from Plattsburg to  were very interesting due to the wide variation in free air temperature. At approximately mid-mission the temperature was as much as 15° C. warmer than standard. This resulted in a peculiar altitude relationship. The airplane did not show any appreciable climb until the last portion of the flights. The range versus fuel totalizer relationship was satisfactory but may have been affected by the wind. The air miles have not yet been calculated.

##### Maximum Power Missions

All of the short training missions were flown at maximum allowable engine power. In general, these flights reached the proper altitude for the amount of fuel carried.

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### Simulated Missions

Two simulated missions were flown with aircraft #351. These were complete with as many turns and flight lines as would be the case for a representative mission. The first was made at maximum power. The altitude relationship was exactly as predicted by the flight handbook and the airplane reached an altitude of [ ] indicated on the fuel counter. At the end of 6:45 hours the endurance curve showed approximately 10 gallons below the predicted relationship. This amount is more than accounted for by the taxi fuel used reaching the take-off position. The ground miles versus fuel totalizer relationship showed 30 gallons below that anticipated. This would be expected based on the taxi fuel, turns and possible wind effects. The air miles have not been calculated yet.

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The second simulated mission was a level off at [ ] feet. This also was complete with turns and flight lines representing a normal mission. The altitude relationship was 300 to 400 feet below predicted due to the fact that the air temperature was slightly warmer than standard. The endurance curve was also slightly low due to the warmer temperature and taxi fuel. This amounted to 20 gallons. The ground miles versus fuel totalizer relationship showed 30 gallons below that anticipated and the same comments apply as on the first simulated mission.

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### Manufactured Fuel

After each of the two simulated missions were completed the remaining fuel was drained from the airplane in order to serve as a check on performance and fuel consumptions. The following results were obtained.

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### First Mission

Fuel drained from aircraft	= 80 gallons
Totalizer reading at shutdown	= 45 gallons
"Manufactured" fuel	= <u>35</u> gallons

### Second Mission

Fuel drained from aircraft	= 90 gallons
Totalizer reading at shutdown	= 51 gallons
"Manufactured" fuel	= <u>39</u> gallons

"Manufactured" fuel is the term used to describe the apparent increase of fuel on board due to the characteristics of the measuring system. This increase in gallons is due to heating of the fuel by the fuel-oil heat exchanger and the engine fuel pump.

"Manufactured" fuel seems fairly consistent on the U-2C airplane. This is due in part to the higher temperature setting of the fuel-oil heat exchanger. Note should be taken of this reserve fuel in flight planning.

### Operational Readiness:

#### Aircraft

The U-2C aircraft continued to perform reliably during the training phase. This confirms the experience gained during the accelerated service test at EAFB. During this training phase there were no aborts and no serious difficulties. The amount of maintenance required was very low. The only serious problem existing at the present time is D.C. generator brush life. This is not an operational deterrent since it can be combated by proper inspection and replacement as required.

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### **Engine**

The engine is performing reliably and has only minor problems.

The present service life of 100 hours imposes a serious handicap on operations at the Detachments since the calendar time for transportation and the overhaul time is extensive. Only one spare is presently available at Detachment "B". Every effort must be made to gain enough experience to allow an increase in the time between overhauls.

The engine is considered to be operationally ready.

### **A.C. Generator System**

The A.C. generator system was not fully developed and "as installed" produced a low frequency voltage supply of 370 cycles/sec. compared with the 400 cycles/sec desired. Several changes were made including: higher air pressure on the hydraulic supply tank, elimination of special quick disconnect fittings and resetting of the hydraulic flow regulator. With these changes the system operated satisfactorily during engine ground test runs. With a 600 VA load, the voltage was 120 and the frequency 398 cycles/sec.

With System VI installed as a load, the A. C. Generator functioned properly in flight. Further observations of the operating frequency should be made, but the system appears to be satisfactory.

### **System VI**

This system was installed and operated in flight. Minor bracket revisions were necessary and were easily accomplished. Operation appeared to be satisfactory and results are being analyzed.

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### Camera Configurations

One flight was made with an A-2 Configuration although this is not to be used on actual missions and no shock mounts are available for it.

It was discovered that certain specific "B" Cameras are slightly longer in the lens barrel than others due to individual focusing adjustments. When one of these longer cameras was tried in the airplane the lens was very close to equipment and ducting inside the hatch. In order to provide adequate clearance new mounts are being made to raise the camera approximately one half-inch. These "B" Cameras adjusted to a shorter Barrel length can be accommodated with the present vibration mounts, as could the camera in use at EAFB.

Photographic results with the "B" Camera and vibration mounts in airplane #358 were very satisfactory. Proper evaluation at Det. "B" has not yet been made in airplane #351 although this was satisfactorily accomplished at EAFB.

The airplane is considered to be operationally ready with the "B" Camera.

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By:

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Approved:

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*To: Col. Rourke*

PRELIMINARY NOTES

*(VB)*

**U-2 PERFORMANCE**

1. Airplane #349 flown with 1335 gallons. Results very close to Flight Handbook information.

2. Airplane #367 was flown with various fuel loads and was below the Flight Handbook curve. It appeared to be flying slightly fast and a pacer flight with airplane #349 confirmed this for the early part of the cruise climb. A new airspeed schedule was devised and results are somewhat improved. Further flights will be necessary to fully evaluate this new schedule.

3. Some of the various factors affecting the fuel schedule are as follows:

Aircraft weight

External Antennas

Taxi Fuel

Flowmeter Calibration

Turns on the Flight Plan

Free Air Temperature

Level Off During Climb-out

A brief evaluation of the effect of turns was made. Eight consecutive turns were accomplished in a period of 5 minutes using a 20° bank. This resulted in an apparent increase in fuel consumption of 15 gallons.

Taxi fuel usually amounts to 15 to 20 gallons more than Handbook allowance with the procedure being used.

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Further study will be made of the magnitude of the factors listed above.

4. The data collected will be studied more in detail and the information will be made available.

LOG OF FLIGHTS

	<u>AIRPLANE</u>	<u>DATE</u>	<u>PILOT</u>	<u>FUEL</u>	<u>REMARKS</u>	<u>FLIGHT HOURS</u>
25X1	367	19 Aug 59		1535	Slippers, all equip., no antennas	6:00
	367	20 Aug 59		1035	8 rev. turns	2:35
	349	21 Aug 59		1335	No slippers, no ant.	5:50
	367	21 Aug 59		1035	Pacing #349	4:40
	367	27 Aug 59		1335	Ventral, Slippers	6:00

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